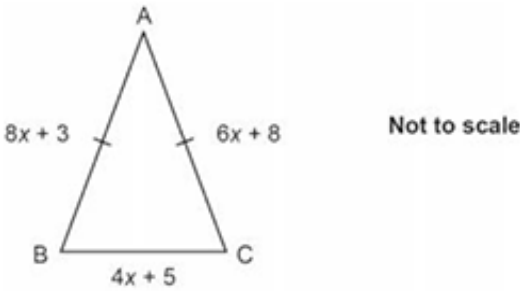


Mensuration (F) QP

1. In this question, all lengths are in centimetres.

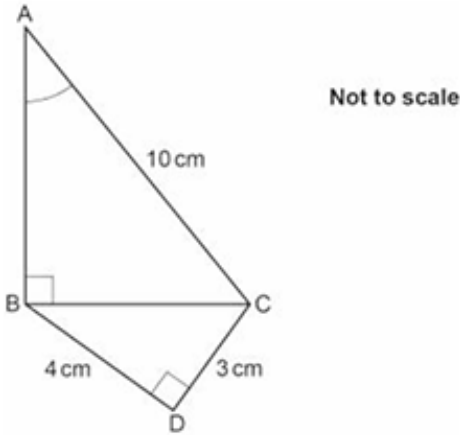
The diagram shows an isosceles triangle ABC.
AB = AC.



Find the perimeter of the triangle.
You must show your working.

..... cm **[6]**

2. The diagram shows two right-angled triangles, ABC and BDC, joined at BC.



Work out angle BAC.
You must show your working.

..... ° **[5]**

3(a). The table shows charges made by a gas company to its customers.

Cost per day	23p
PLUS	
Cost per unit of gas used	7p

The owner of a flat receives a gas bill covering a period of 100 days.
They have used 7000 units of gas in this period.

Show that their bill is for £513.

[4]

(b). The owner of a house is supplied gas by a gas company.

- The cost per day is 35p.
- Added to this cost, they use 10 000 units of gas in 100 days
- Their bill covering the period of 100 days is £885.

Work out the cost per unit of gas used, giving your answer in pence.

..... p [4]

4. Here is a rectangle.



Work out the area of the rectangle.

..... cm² [2]

5(a). Complete each statement.

i. 29 kilograms = grams. [1]

ii. 308 millilitres = litres. [1]

iii. 7 square centimetres = square millimetres. [1]

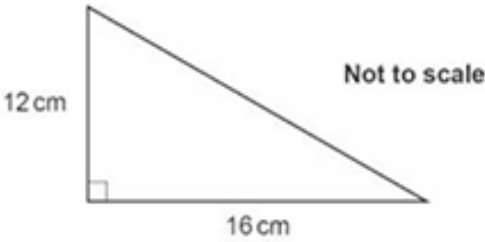
(b). A train travels 100 km at an average speed of 80 km/h.

Work out the time taken for this journey.
Give your answer in hours and minutes.

..... hours minutes [3]

6(a).

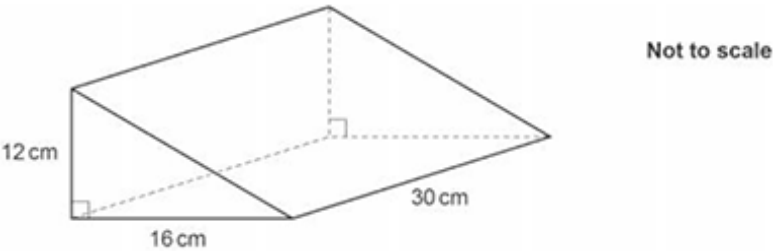
The diagram shows the cross-section of a triangular prism.



Work out the area of the cross-section.

..... cm² [2]

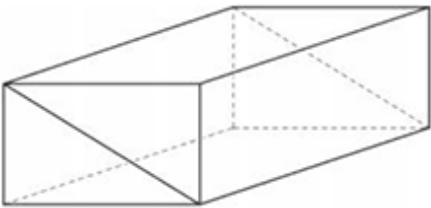
(b). This diagram shows the triangular prism.



Work out the total surface area of the triangular prism.
You must show your working.

..... cm² **[5]**

(c). Two of these triangular prisms are joined to make a new prism.



Give a reason why the total surface area of this prism is **not** two times your answer in the previous **part**.

..... **[1]**

7.

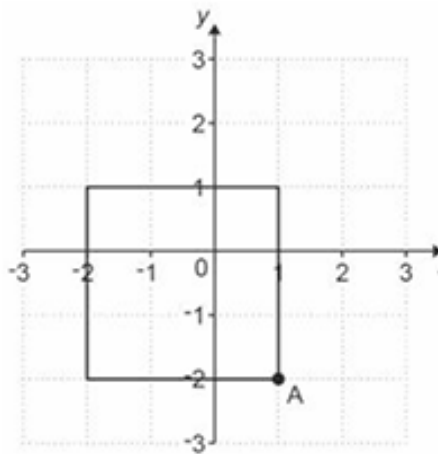
A weather blogger writes:

- 1.495×10^{11} raindrops fall in a storm.
- the mass of each raindrop is 6×10^{-5} grams.

Calculate the total mass of all of the raindrops that fall in the storm.
Give your answer in standard form in kilograms.

..... kilograms **[4]**

8. The diagram shows a square drawn on a one-centimetre square grid.



Find the area of the square.

..... cm² **[1]**

9. These are the ingredients for making some scones.

Flour	350 g
Butter	80 g
Sugar	55 g
Milk	160 ml

10 ml of milk weighs 10.4 g.

Work out the **total** weight of all the ingredients.

10. Force is measured in newtons (N).

A force of 180 N is applied to a surface of area 8 cm^2 .

Work out the pressure, in N/cm^2 , applied to this surface.

..... g [3]

..... N/cm^2 [2]

11. The circumference of a circle is 21 cm.

Calculate the diameter of the circle.

Give your answer correct to 1 decimal place.

..... cm [3]

12. The cost of sending a child to nursery is £4.40 per hour on each weekday.

On Saturday the cost is $1\frac{1}{4}$ times the weekday hourly rate.

A child goes to nursery for:

- 8 hours on Wednesday
- 4 hours on Thursday
- 3 hours on Saturday.

The **total cost** for the three days is reduced by 10% as a special offer.

Work out the cost for the three days after the 10% reduction.

You must show your working.

£ [6]

13(a). The table shows how much Ivan earns per hour.

Work done on Monday to Friday	£20.23 per hour
Work done on Saturday or Sunday	£30.18 per hour

One week Ivan works for $30\frac{1}{4}$ hours between Monday and Friday and then for $5\frac{1}{3}$ hours on Saturday.
Ivan says

I will earn at least £700 for my work this week.

By rounding each value to the nearest integer, use estimation to show that Ivan may be correct.

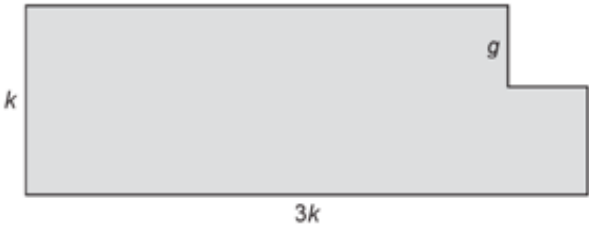
[5]

(b). Give **one** reason why your working in part (a) shows that Ivan can be **certain** of earning at least £700 for his work in this week.

[1]

14. In this question all measurements are in centimetres.

The shaded shape is made by cutting a square from the corner of a rectangle.



The width of the rectangle is k .
The length of the rectangle is $3k$.
Each side of the square is g .

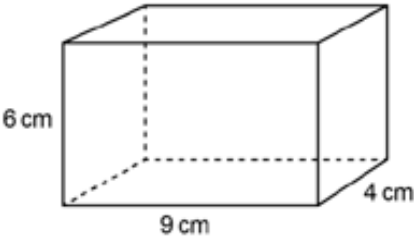
- i. Find an expression for the perimeter of the shaded shape.
Give your answer in its simplest form.

..... [3]

ii. Find the value of k when the perimeter of the shaded shape is 81.6.

$k =$ [2]

15. The diagram shows a cuboid.



i. How many faces does the cuboid have?

..... [1]

ii. The cuboid has dimensions 9 cm, 6 cm and 4 cm.

Work out the volume of the cuboid.

..... cm^3 [2]

16. Write 1200 metres as a fraction of 3 kilometres.
Give your answer in its simplest form.

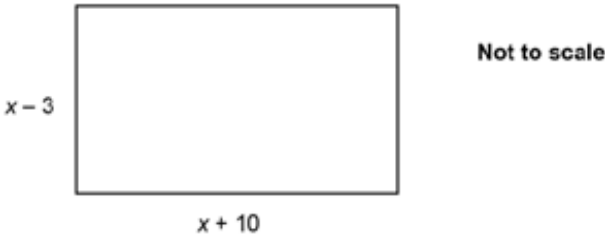
..... [3]

17. A circle has radius 6 cm.

Work out the area of the circle.

..... cm^2 [2]

18. In this question, all lengths are in centimetres.



The area of the rectangle is 90 cm².

Show that $x^2 + 7x - 120 = 0$.

[4]

19(a). Compost is used to grow plants.
Jane has a sack containing 60 litres of compost.
She uses this compost to fill pots for her plants.

Jane fills ten large pots each holding 5.5 litres.

Work out how much compost is left in the sack.

..... litres [2]

(b). Jane uses the remaining compost to fill small pots each holding 800 ml.

Work out the maximum number of small pots Jane can fill with the remaining compost.

..... [3]

(c). Work out how much compost will then be left in the sack.

..... ml [2]

20. A garden sprinkler uses water at a rate of 14 litres per minute.
How much water is used by the garden sprinkler in 15 minutes?

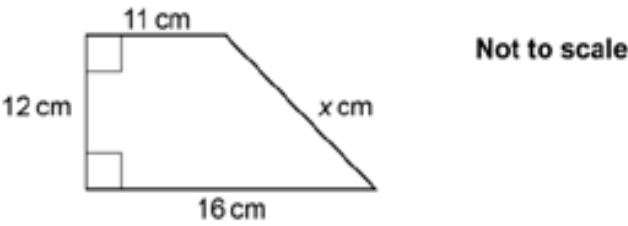
..... litres [2]

21. Use one of these symbols <, > or = to make each statement true.

- 480 g 4.8 kg
- $2\frac{1}{4}$ km 225 m
- 30 mm 3 cm

[3]

22. The diagram shows a trapezium.



Calculate the value of x.

x = [4]

23.

The scale of a map is 1 : 20 000.

Two castles are 4 kilometres apart on the ground.

Work out how far apart the two castles are on the map.
Give your answer in centimetres.

..... cm **[3]**

24. Sam eats 40% of a 600 g pack of cereal every day.

Sam has no cereal left.
The cereal is no longer sold in 600 g packs.
Instead, the cereal is now sold in 400 g packs.

Sam wants to continue to eat the same amount of cereal every day.

Work out the **minimum** number of 400 g packs of cereal that Sam must buy to have enough for 7 days.
You must show your working.

..... 400 g packs **[5]**

25. The population of an island is 51 000 people.

The area of the island is 480 km².

Calculate the population density of the island in people per km².

..... people per km² **[2]**

26. The diagram shows two sides of a parallelogram drawn on a one-centimetre grid.



- i. Complete the drawing of the parallelogram.
Include notation to show that the drawing is a parallelogram.

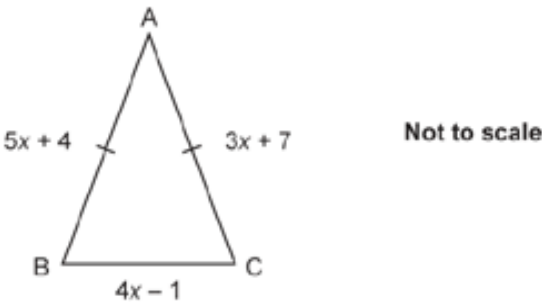
[2]

- ii. Work out the area of the parallelogram.

..... cm² [2]

27. In this question, all lengths are in centimetres.

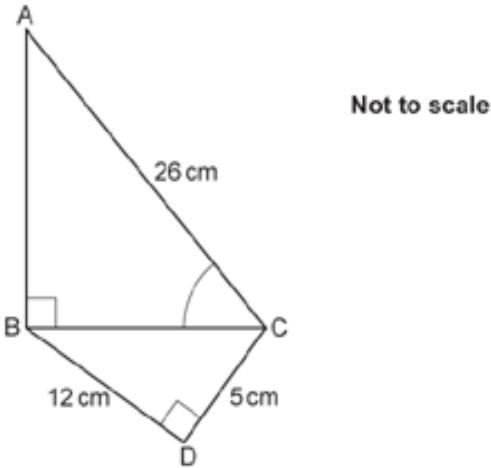
The diagram shows an isosceles triangle ABC. AB = AC.



Find the perimeter of the triangle.
You must show your working.

..... cm [6]

28. The diagram shows two right-angled triangles, ABC and BDC, joined at BC.



Work out angle BCA.
You must show your working.

..... ° [5]

29(a). The table shows charges made by a gas company to its customers.

Cost per day	27p
PLUS	
Cost per unit of gas used	8p

The owner of a flat receives a gas bill covering a period of 100 days.
They have used 7000 units of gas in this period.

Show that their bill is for £587.

[4]

(b). The owner of a house is supplied gas by a company.

- The cost per day is 25p.
- Added to this cost, they use 10 000 units of gas in 100 days.
- Their bill covering the period of 100 days is £975.

Work out the cost per unit of gas used, giving your answer in pence.

.....p [4]

30. Here is a rectangle.



Work out the area of the rectangle.

.....cm² [2]

31(a). Complete each statement.

i. 35 kilograms = grams.

[1]

ii. 203 millilitres = litres.

[1]

iii. 4 square centimetres = square millimetres.

[1]

(b). A train travels 90 km at an average speed of 40 km/h.

Work out the time taken for this journey.
Give your answer in hours and minutes.

..... hours minutes [3]

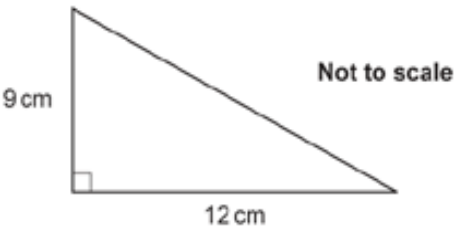
32. A weather blogger writes:

- 1.655×10^{12} raindrops fall in a storm
- the mass of each raindrop is 6×10^{-5} grams.

Calculate the total mass of all of the raindrops that fall in the storm.
Give your answer in standard form in kilograms.

..... kilograms **[4]**

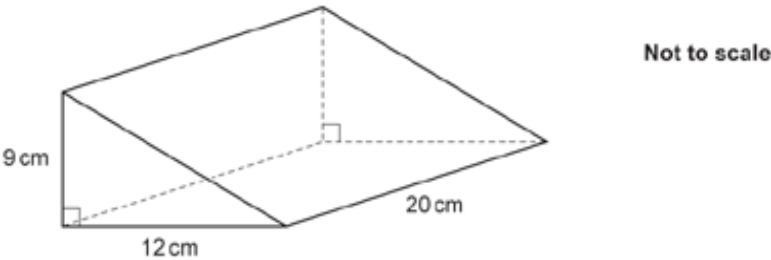
33(a). The diagram shows the cross-section of a triangular prism.



Work out the area of the cross-section.

(a) cm²**[2]**

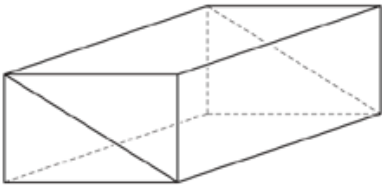
(b). This diagram shows the triangular prism.



Work out the total surface area of the triangular prism.
You must show your working.

(b) cm²**[5]**

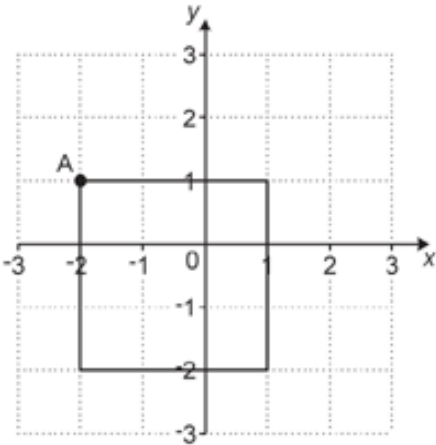
(c). Two of these triangular prisms are joined to make a new prism.



Give a reason why the total surface area of this prism is **not** two times your answer in the previous **part**.

.....**[1]**

34. The diagram shows a square drawn on a one-centimetre square grid.



Find the perimeter of the square.

..... cm**[1]**

35. These are the ingredients for making some scones.

Flour	360 g
Butter	90 g
Sugar	45 g
Milk	180 ml

10 ml of milk weighs 10.4 g.

Work out the **total** weight of all the ingredients.

..... g [3]

36. Force is measured in newtons (N).

A force of 140N is applied to a surface of area 8cm^2 .

Work out the pressure, in N/cm^2 , applied to this surface.

..... N/cm^2 [2]

37. The circumference of a circle is 17cm.

Calculate the diameter of the circle.

Give your answer correct to **1** decimal place.

..... cm [3]

38. The cost of sending a child to nursery is £5.80 per hour on each weekday.

On Saturday the cost is $1\frac{1}{4}$ times the weekday hourly rate.

A child goes to nursery for:

- 6 hours on Wednesday
- 5 hours on Thursday
- 4 hours on Saturday.

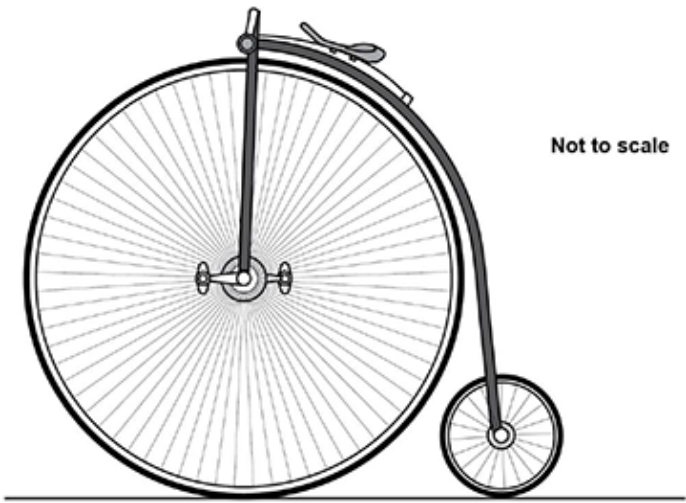
The **total cost** for the three days is reduced by 5% as a special offer.

Work out the cost for the three days after the 5% reduction.

You must show your working,

£ [6]

39. The diagram shows a Penny Farthing bicycle.



The diameter of the large wheel is 120 cm.
The diameter of the small wheel is 42 cm.

On a short journey, the large wheel makes exactly 63 rotations.
The small wheel also makes an exact number of rotations.

Work out the number of rotations made by the small wheel.

..... [4]

40. Work out the perimeter of this rectangle.



Not to scale

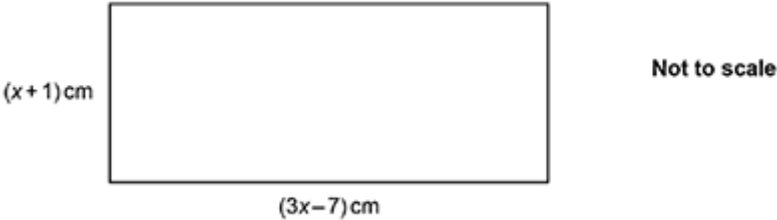
..... cm **[2]**

41. A solid rubber ball has a volume of 300 cm^3 .
The density of the rubber is 0.9 g/cm^3 .

Calculate the mass of the rubber ball.
Give the units of your answer.

..... **[3]**

42. The diagram shows a rectangle with length $(3x - 7)\text{ cm}$ and width $(x + 1)\text{ cm}$.



The length of the rectangle is twice the width of the rectangle.
Calculate the area of the rectangle.
You must show your working.

..... cm^2 **[6]**

43. A triangle has sides of length 5 cm, 9 cm and 11 cm.

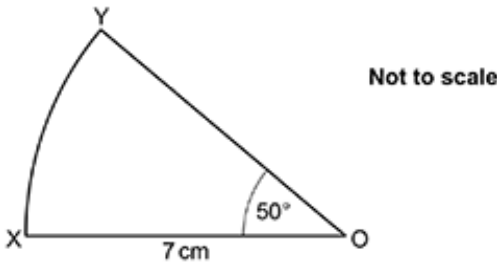
Is this a right-angled triangle?
Show how you decide.

because

44. By rounding each value to **one** significant figure, estimate the cost of 7.3 kg of potatoes at 62p per kg.
Give your answer in pounds.

£

45. XOY is a sector of a circle, centre O.



Show that the area of the sector is 21.4 cm², correct to 3 significant figures.

[3]

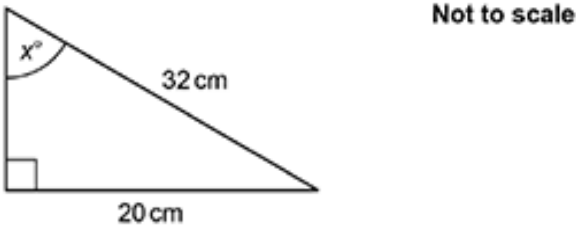
46(a). A student is using trigonometry to work out an angle, B, in a right-angled triangle.

They tell the teacher that $\cos B = \frac{6}{5}$.

Explain why this student must be wrong.

[1]

(b). Here is a right-angled triangle.



Work out the value of x.

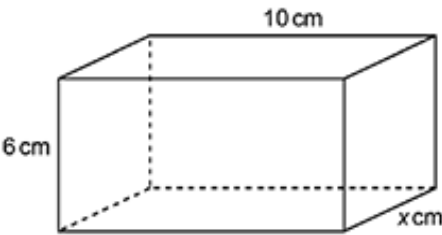
x = [3]

47. A painter mixes blue paint and red paint in the ratio 3 : 5.
They make a total of 1.6 litres of paint.

Work out how much blue paint they use.
Give your answer in millilitres.

..... ml [3]

48. The diagram shows a cuboid with dimensions 10 cm, 6 cm and x cm.



Not to scale

The volume of the cuboid is 420 cm³.
Find the value of x.

x = [3]

49. Alex and Emma compete in the same motorcycle race.
Alex completes the race in 5 hours.
Alex’s average speed was 40 miles per hour.
Emma’s average speed was 32 miles per hour.

Calculate how long it took Emma to complete the race.
Give your answer in hours and minutes.

..... hours minutes **[4]**

50. The costs to hire a campervan are shown below.

Campervan hire	
First day	£110
Each extra day	£80
Each mile travelled	70p

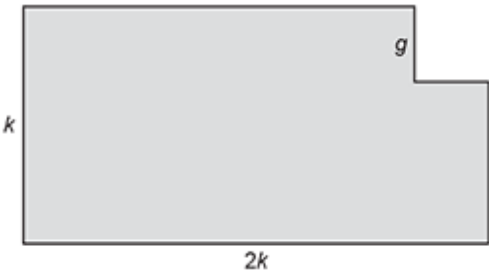
Riley hired a campervan and travelled 480 miles.
The total cost of hiring the campervan was £766.

Calculate how many days Riley hired the campervan for.
You must show your working.

..... days **[5]**

51. In this question all measurements are in centimetres.

The shaded shape is made by cutting a square from the corner of a rectangle.



The width of the rectangle is k .
The length of the rectangle is $2k$.
Each side of the square is g .

- i. Find an expression for the perimeter of the shaded shape.
Give your answer in its simplest form.

..... **[3]**

ii. Find the value of k when the perimeter of the shaded shape is 62.4.

$k =$ [2]

52. Write 400 metres as a fraction of 2 kilometres.
Give your answer in its simplest form.

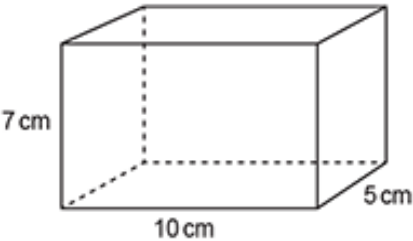
..... [3]

53. A circle has radius 8 cm.

Work out the area of the circle.

..... cm^2 [2]

54. The diagram shows a cuboid.



i. How many edges does the cuboid have?

..... [1]

ii. The cuboid has dimensions 10 cm, 7 cm and 5 cm.

Work out the volume of the cuboid.

..... cm^3 [2]

55. In this question, all lengths are in centimetres.



The area of the rectangle is 70cm².

Show that $x^2 + 5x - 84 = 0$

[4]

56(a). Compost is used to grow plants.
Ivan has a sack containing 50 litres of compost.
He uses this compost to fill pots for his plants.

Ivan fills six large pots each holding 7.5 litres.

Work out how much compost is left in the sack.

..... litres [2]

(b). Ivan uses the remaining compost to fill small pots each holding 400 ml.

Work out the maximum number of small pots Ivan can fill with the remaining compost.

..... [3]

(c). Work out how much compost will then be left in the sack.

..... ml [2]

57(a). The table shows how much Amaya earns per hour.

Work done on Monday to Friday	£20.15 per hour
Work done on Saturday or Sunday	£30.23 per hour

One week Amaya works for $40\frac{1}{3}$ hours between Monday and Friday and then for $4\frac{1}{4}$ hours on Saturday.

Amaya says

I will earn at least £900 for my work this week.

By rounding each value to the nearest integer, use estimation to show that Amaya may be correct.

[5]

(b). Give **one** reason why your working in part (a) shows that Amaya can be **certain** of earning at least £900 for her work in this week.

.....
..... [1]

58. A bathroom shower uses water at a rate of 15 litres per minute.

How much water is used in a bathroom shower that lasts 12 minutes?

..... litres **[2]**

59. Use one of these symbols <, > or = to make each statement true.

- 60mm 6cm
- 320g 3.2kg
- $1\frac{3}{4}$ km 17500m

[3]

60. Sam eats 30% of a 600 g pack of cereal every day.

Sam has no cereal left.
The cereal is no longer sold in 600 g packs.
Instead, the cereal is now sold in 400 g packs.

Sam wants to continue to eat the same amount of cereal every day.

Work out the **minimum** number of 400 g packs of cereal that Sam must buy to have enough for 7 days.
You must show your working.

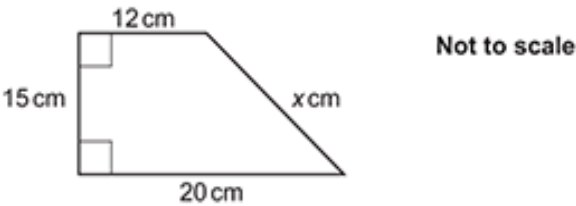
..... 400 g packs **[5]**

61. The population of an island is 47 000 people.
The area of the island is 560 km².

Calculate the population density of the island in people per km².

..... people per km² [2]

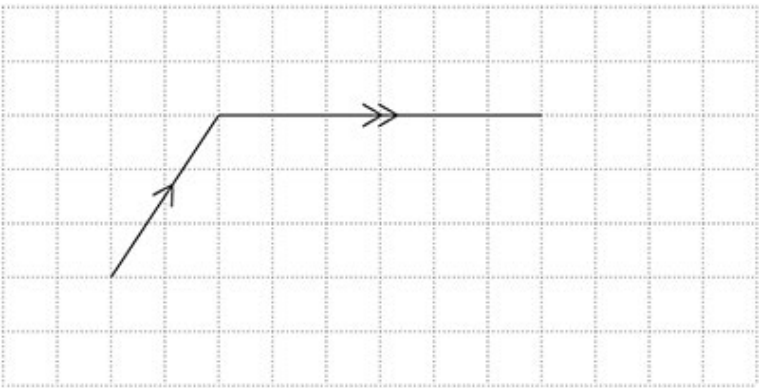
62. The diagram shows a trapezium.



Calculate the value of x .

$x =$ [4]

63. The diagram shows two sides of a parallelogram drawn on a one-centimetre grid.



- i. Complete the drawing of the parallelogram.
Include notation to show that the drawing is a parallelogram.

[2]

- ii. Work out the area of the parallelogram.

..... cm² [2]

64. The scale of a map is 1 : 25 000.

Two castles are 6 kilometres apart on the ground.

Work out how far apart the two castles are on the map.
Give your answer in centimetres.

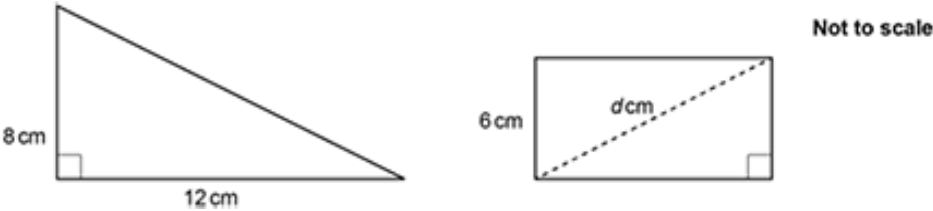
..... cm **[3]**

65. It takes a librarian $1\frac{1}{2}$ minutes to put a plastic cover on a book.

Work out how many books the librarian can cover in $\frac{1}{2}$ hour.

..... **[3]**

66. The diagram shows a right-angled triangle and a rectangle.



The triangle and rectangle have the same area.

Calculate the length, d cm, of the diagonal of the rectangle.
You must show your working.

$d = \dots\dots\dots \text{ cm}$ [6]

67. Jamal has £8 to spend on vegetables.
The table shows the prices.

Cauliflower (each)	£1.30
Potatoes (for 1 kilogram)	85p
Mushrooms (for a 400 g pack)	£1.20

Jamal buys 3 cauliflowers and 2 kilograms of potatoes.
Jamal spends the remaining money on mushrooms.

Work out the **mass, in grams**, of mushrooms that Jamal buys.
You must show your working.

$\dots\dots\dots \text{ g}$ [6]

68. The density of gold is 19.3 g/cm^3 .
Ben has a gold nugget of volume 6.8 cm^3 .

Calculate the mass of the gold nugget.

$\dots\dots\dots \text{ g}$ [2]

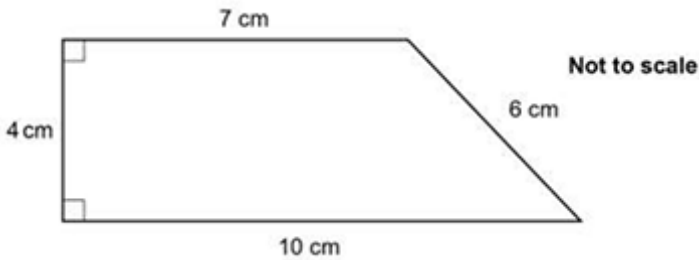
69. Sam makes 16 cakes.
Each cake needs a piece of ribbon 17 cm long for decoration.

Ribbon is only sold in rolls of 1.1 metres, which can then be cut into 17 cm pieces.
One roll of ribbon costs 84p.

Calculate the cost of the ribbon that Sam must buy to decorate the 16 cakes.
You must show your working.

£ [4]

70(a). Work out the area of this trapezium.



..... cm² [2]

(b). The circumference of a circle, in terms of π , is 90π cm.
Work out the radius of the circle.

.....cm [2]

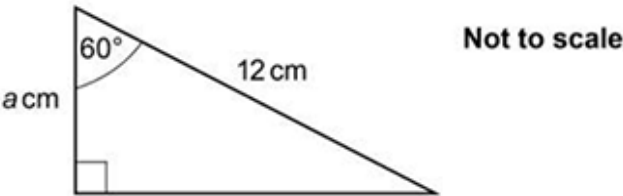
71. A cone has a base radius of 3 cm.
It has a height of 4cm

Calculate the volume of the cone.
Give your answer in terms of π in its simplest form.

[The volume V of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$.]

..... cm³ [3]

72. The diagram shows a right-angled triangle.



Work out the value of a .

$a =$

[3]

73(a). Hiro is 1.23 metres tall.
Sasha is 94 centimetres tall.

Find, in centimetres, how much taller Hiro is than Sasha.

..... cm [2]

(b). Arrange these units of mass in order of size starting with the smallest.

240 grams

$\frac{1}{4}$ kilogram

0.2 kilograms

0.249 kilograms

,
,

[2]

smallest

74(a). The scale drawing shows the positions of two towns, A and B.

Scale: 1cm represents 5km



Town C is 25 km from town B on a bearing of 230°.

On the scale drawing, mark and label the position of town C with a cross.

[2]

(b). Find the actual distance between town A and town B.

..... km [2]

75. Ryan and Sam work in a restaurant.
Ryan is paid £11 per hour and Sam is paid £10 per hour.

One week, Ryan works a total of 20 hours.
Sam earns £70 more than Ryan that week.

Work out the number of hours that Sam works.

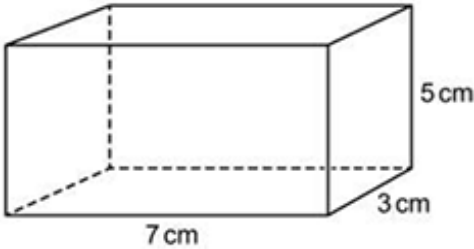
.....hours **[4]**

76. A farmer keeps goats in a rectangular field measuring 130 m by 190 m.
The farmer can keep up to 18 goats per hectare in the field.
1 hectare is 10 000 square metres.

Work out the maximum number of goats the farmer can keep in the field.

..... **[4]**

77. Work out the surface area of the cuboid.



..... cm² **[3]**

78(a). Umi runs 1875 metres in 6 minutes.
Calculate his average speed in metres per minute.

..... m / min [2]

(b). Umi says

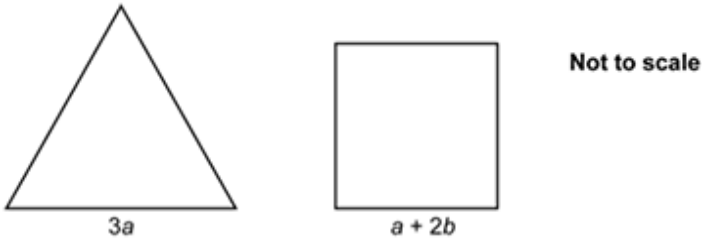
This means I can run 9375 metres in 30 minutes.

Write down **one** assumption Umi has made.

..... [1]

79. In this question, all lengths are in centimetres.

The diagram shows an equilateral triangle and a square.



The perimeter of each shape is 72 cm.

Find the value of *b*.

b = [4]

80. Mr Fox is paid £24.90 per hour for working on a weekday.

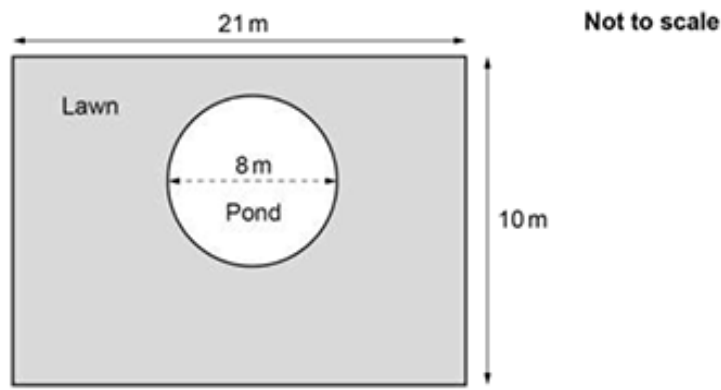
On a Sunday, Mr Fox is paid at $1\frac{2}{3}$ times this hourly rate.

How much does Mr Fox earn for working 7 hours on a Sunday?

£ [3]

81. The diagram shows Alex’s garden.
The garden is a rectangle, 21 m by 10 m.

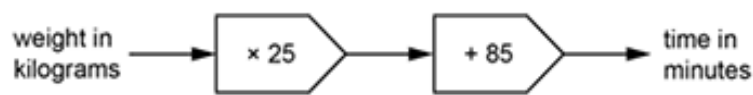
It has a lawn and a pond.
The pond is a circle of diameter 8 m.



Work out the area of Alex’s **lawn**.

..... m² [4]

82. Here is a rule to work out the time, in minutes, needed to cook a turkey.



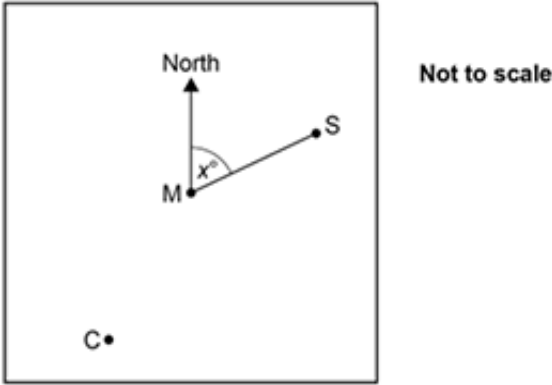
Jamie cooks a turkey.
His turkey weighs 5 kg.
Jamie wants to take his turkey out of the oven at 2:05 pm.

Use the rule to work out at what time Jamie should put his turkey in the oven.
You must show your working.

..... [5]

83(a). A playground has a maze (M) at the centre.
There is also a climbing frame (C) and a swing (S).

The bearing of the swing from the maze is x° .



The bearing of the climbing frame from the maze is 160° more than the bearing of the swing from the maze.

Write down, in terms of x , the bearing of the climbing frame from the maze.

..... $^\circ$ [1]

(b). The bearing of the climbing frame from the maze is also five times the bearing of the swing from the maze.

Work out the bearing of the climbing frame from the maze.

..... $^\circ$ [4]

84(a). Circle the value of $\cos 60^\circ$.

$$\frac{1}{3}$$

$$\frac{\sqrt{3}}{2}$$

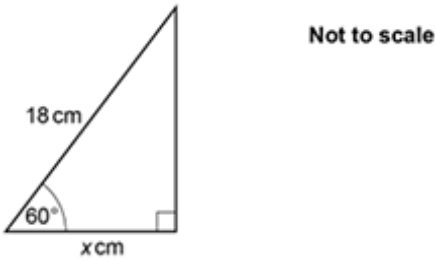
$$\frac{1}{2}$$

$$\frac{\sqrt{3}}{3}$$

$$\frac{1}{4}$$

[1]

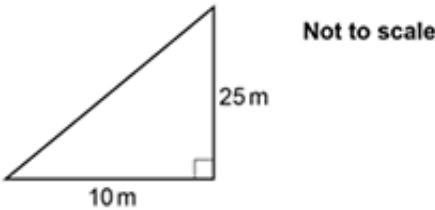
(b). Here is a right-angled triangle.



Work out the value of x .

$x = \dots\dots\dots$ [2]

85. The diagram shows Anika’s garden.
It is in the shape of a right-angled triangle.



Anika is going to spread grass seed on the garden.

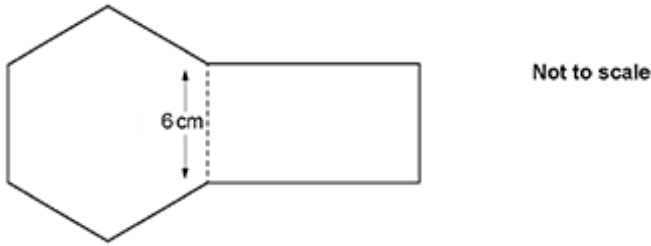
- A bag of grass seed covers an area of 15 m².
- Each bag of grass seed costs £3.99.

Anika can only buy whole bags of grass seed.
Anika buys the least number of bags needed for the garden.

Calculate the cost of buying the bags of grass seed that Anika needs.
You must show your working.

£ [6]

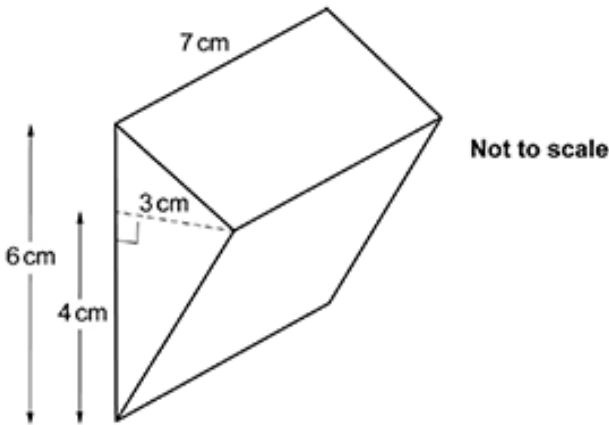
86. The shape below is formed by a rectangle of width 6 cm and a regular hexagon. For the rectangle, the ratio of the width to the length is 3 : 5.



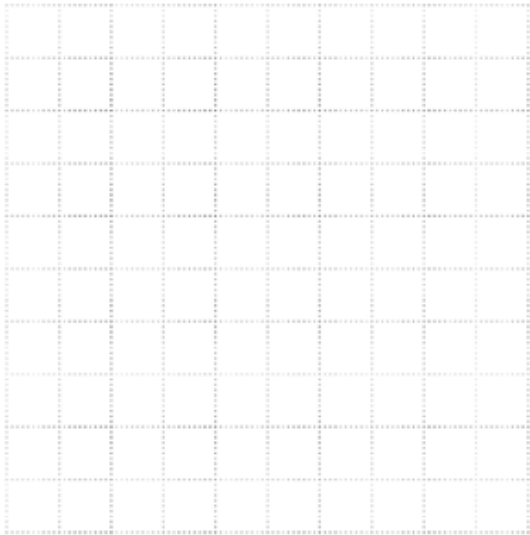
Work out the perimeter of the shape.

..... cm [4]

87(a). The diagram shows a prism.



- i. On the one-centimetre square grid below, draw an accurate side view of the prism from the direction of the arrow.



[3]

ii. Show that the volume of the prism is 63 cm^3 .

[2]

(b). A cuboid with a square base has a volume of 56 cm^3 .
The length of one side of the cuboid's square base is 2 cm .

Work out the height of the cuboid.

..... cm [3]

88. Here is a right-angled triangle.



Work out the value of h .

$h = \dots\dots\dots$ [3]

89. Harper and Li travel the same distance from town A to town B.

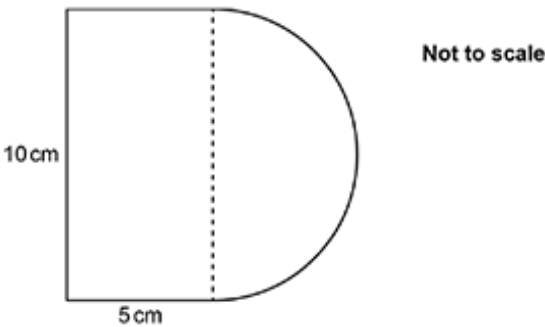
Harper travels at an average speed of 48 kilometres per hour (km/h).
Li travels at an average speed of 14 metres per second (m/s).

The journey takes Harper 5 hours.

Calculate how long the journey takes Li.
Give your answer in hours and minutes, correct to the **nearest minute**.
You must show your working.

$\dots\dots\dots$ hours $\dots\dots\dots$ minutes [6]

90. A rectangle, 10 cm by 5 cm, and a semicircle are joined to make this shape.



Work out the area of the shape.

..... cm² [4]

91(a). In this question, all measurements are in centimetres.



The square and the rectangle have the same area.

Show that $x^2 - 4x - 12 = 0$.

[3]

(b). Solve $x^2 - 4x - 12 = 0$.

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

(c). Explain why one of the answers in part (b) is not possible in the context of the question.

.....

----- [1]

(d). Write down the following.

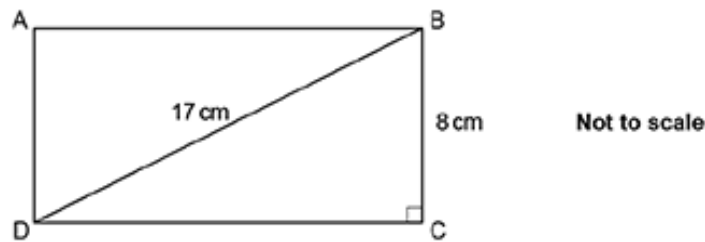
i. The area of the square.

..... cm² [1]

ii. The length of the rectangle.

..... cm [1]

92. The diagram shows rectangle ABCD.



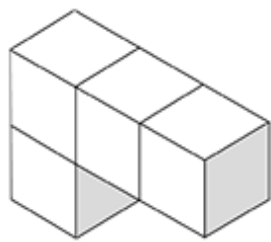
DB = 17 cm and BC = 8 cm.

Calculate the area of the rectangle.
You must show your working.

..... cm² [5]

93. A student has some cubes that are all the same size.
Each cube is 5 cm by 5 cm by 5 cm.

They put 4 of these cubes together to make this shape.



Calculate the surface area of the shape.

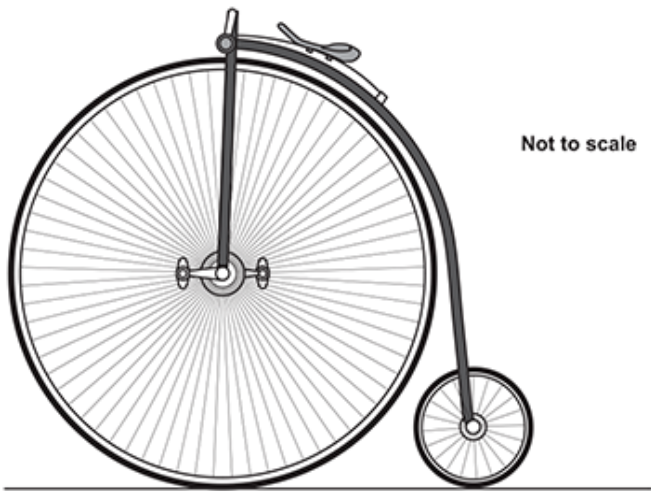
..... cm² **[4]**

94. Rowan has 40 m of ribbon.
They cut the ribbon into lengths of 70 cm.

What is the least length of ribbon, in cm, that can be left over?
You must show your working.

..... cm [5]

95. The diagram shows a Penny Farthing bicycle.



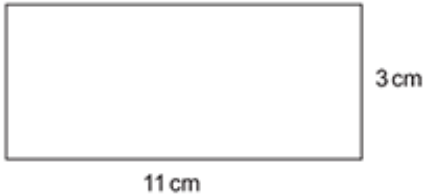
The diameter of the large wheel is 130 cm.
The diameter of the small wheel is 46 cm.

On a short journey, the large wheel makes exactly 69 rotations.
The small wheel also makes an exact number of rotations.

Work out the number of rotations made by the small wheel.

..... [4]

96. Work out the perimeter of this rectangle.



Not to scale

..... cm [2]

97. A triangle has sides of length 6 cm, 10 cm and 12 cm.

Is this a right-angled triangle?
Show how you decide.

..... because

..... [4]

98. By rounding each value to **one** significant figure, estimate the cost of 8.2 kg of bananas at 73p per kg.
Give your answer in pounds.

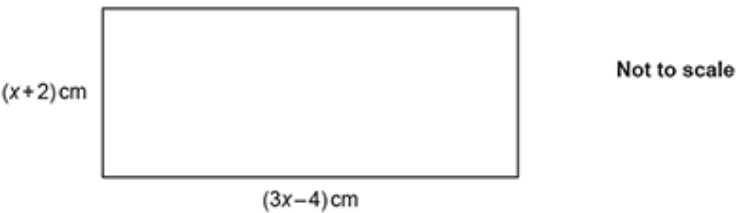
£ [3]

99. A solid wooden block has a volume of 900 cm³.
The density of the wood is 0.7 g/cm³.

Calculate the mass of the wooden block.
Give the units of your answer.

..... [3]

100. The diagram shows a rectangle with length $(3x - 4)\text{cm}$ and width $(x + 2)\text{cm}$.



The length of the rectangle is twice the width of the rectangle.

Calculate the area of the rectangle.
You must show your working.

..... cm^2 **[6]**

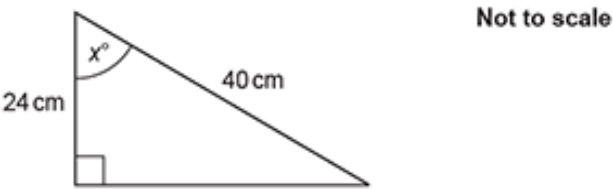
101(a). A student is using trigonometry to work out an angle, B , in a right-angled triangle.

They tell the teacher that $\sin B = \frac{5}{4}$.

Explain why this student must be wrong.

.....
.....
..... **[1]**

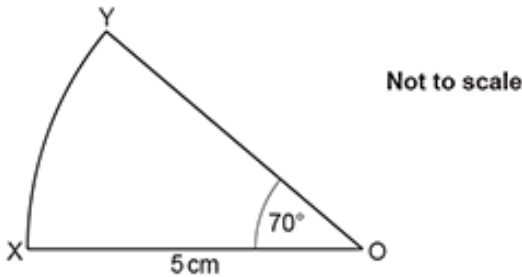
(b). Here is a right-angled triangle.



Work out the value of x .

$x =$ **[3]**

102. XOY is a sector of a circle, centre O.



Show that the area of the sector is 15.3 cm², correct to 3 significant figures.

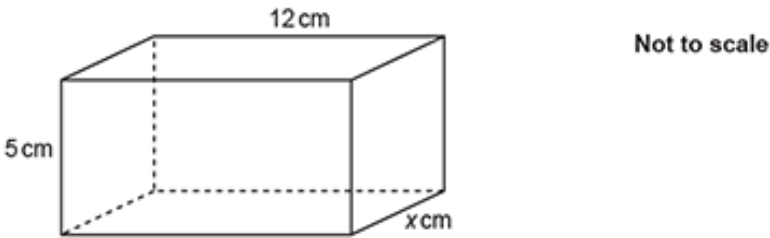
[3]

103. A painter mixes red paint and yellow paint in the ratio 2 : 3.
They make a total of 1.5 litres of paint.

Work out how much red paint they use.
Give your answer in millilitres.

..... ml [3]

104. The diagram shows a cuboid with dimensions 12 cm, 5 cm and x cm.



The volume of the cuboid is 240 cm³.
Find the value of x.

x = [3]

105. Heidi and Yoshi compete in the same car race.
Heidi completes the race in 6 hours.
Heidi’s average speed was 50 miles per hour.
Yoshi’s average speed was 48 miles per hour.

Calculate how long it took Yoshi to complete the race.
Give your answer in hours and minutes.

..... hours minutes **[4]**

106. The costs to hire a motorhome are shown below.

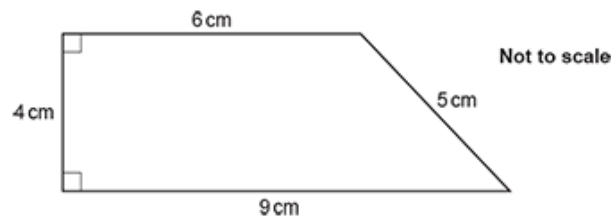
Motorhome hire	
First day	£130
Each extra day	£ 90
Each mile travelled	60p

Finley hired a motorhome and travelled 560 miles.
The total cost of hiring the motorhome was £916.

Calculate how many days Finley hired the motorhome for.
You must show your working.

..... days **[5]**

107(a). Work out the area of this trapezium.



..... cm² [2]

(b). The circumference of a circle, in terms of π , is 100π cm.

Work out the radius of the circle.

..... cm [2]

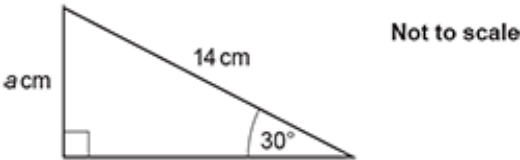
108. A sphere has a radius of 3 cm.

Calculate the volume of the sphere.
Give your answer in terms of π in its simplest form.

[The volume V of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

..... cm³ [3]

109. The diagram shows a right-angled triangle.



Work out the value of a .

$a =$ [3]

110(a).

Alex is 1.34 metres tall.
Gabi is 95 centimetres tall.

Find, in centimetres, how much taller Alex is than Gabi.

..... cm [2]

(b). Arrange these units of capacity in order of size starting with the smallest.

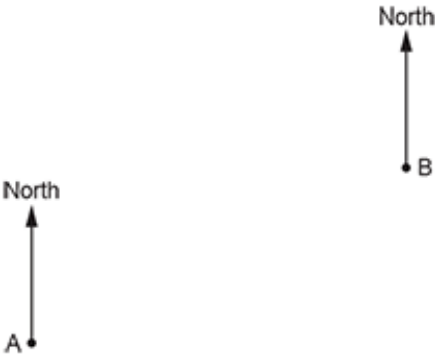
250 millilitres 0.3 litres 0.199 litres

..... , , [2]

smallest

111(a). The scale drawing shows the positions of two towns, A and B.

Scale: 1 cm represents 10 km



Find the actual distance between town A and town B.

..... km [2]

(b). Town C is 55 km from town B on a bearing of 330°.

On the scale drawing, mark and label the position of town C with a cross.

[2]

112. Hiro and Ling work in a restaurant.
Hiro is paid £9 per hour and Ling is paid £10 per hour.

One week, Hiro works a total of 30 hours.
Ling earns £50 more than Hiro that week.

Work out the number of hours that Ling works.

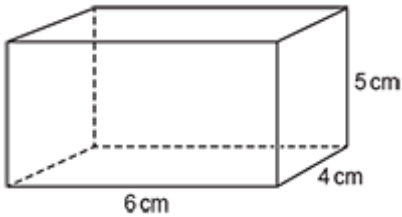
..... hours [4]

113. A farmer keeps sheep in a rectangular field measuring 120 m by 180 m.
The farmer can keep up to 20 sheep per hectare in the field.
1 hectare is 10 000 square metres.

Work out the maximum number of sheep the farmer can keep in the field.

..... [4]

114. Work out the surface area of the cuboid.



..... cm² [3]

115(a). Kareem runs 2460 metres in 8 minutes.

Calculate his average speed in metres per minute.

..... m / min [2]

[1]

[3]

$d = \dots\dots\dots$ cm [6]

118. Ashley has £7 to spend on fruit.
The table shows the prices.

Pineapple (each)	£1.15
Bananas (for 1 kilogram)	70p
Strawberries (for a 200 g pack)	£1.30

Ashley buys 2 pineapples and 3 kilograms of bananas.
Ashley spends the remaining money on strawberries.

Work out the **mass, in grams**, of strawberries that Ashley buys.
You must show your working.

..... g **[6]**

119. The density of gold is 19.3 g/cm³.
Sam has a gold nugget of volume 7.5 cm³.

Calculate the mass of the gold nugget.

..... g **[2]**

120. Morgan makes 15 cakes.
Each cake needs a piece of ribbon 18 cm long for decoration.

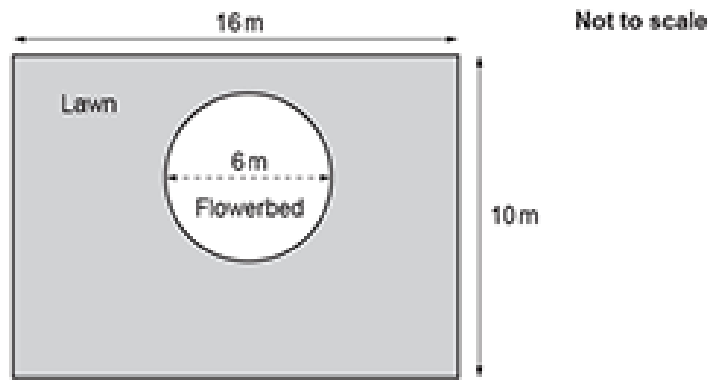
Ribbon is only sold in rolls of 1.2 metres, which can then be cut into 18 cm pieces.
One roll of ribbon costs 92p.

Calculate the cost of the ribbon that Morgan must buy to decorate the 15 cakes.
You must show your working.

£ **[4]**

121. The diagram shows Kai’s garden.
The garden is a rectangle, 16 m by 10 m.

It has a lawn and a flowerbed.
The flowerbed is a circle of diameter 6 m.



Work out the area of Kai’s **lawn**.

..... m² **[4]**

122. Here is a rule to work out the time, in minutes, needed to cook a turkey.



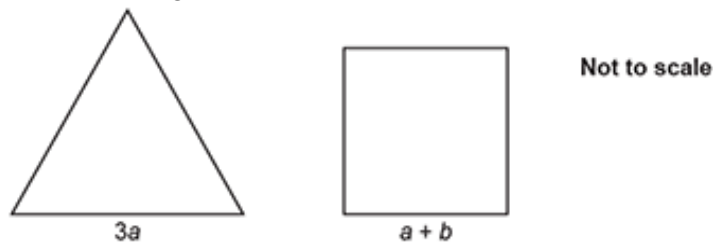
James cooks a turkey.
His turkey weighs 6 kg.
James wants to take his turkey out of the oven at 1:15 pm.

Use the rule to work out at what time James should put his turkey in the oven.
You must show your working.

..... [5]

123. In this question, all lengths are in centimetres.

The diagram shows an equilateral triangle and a square.



The perimeter of each shape is 36 cm.

Find the value of b .

$b =$ [4]

124. Ling is paid £23.40 per hour for working on a weekday.

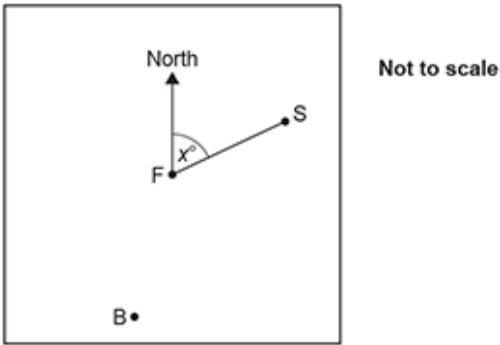
On a Sunday, Ling is paid at $1\frac{1}{3}$ times this hourly rate.

How much does Ling earn for working 8 hours on a Sunday?

£ [3]

125(a). A town square has a fountain (F) at the centre.
There is also a bell tower (B) and a statue (S).

The bearing of the statue from the fountain is x° .



The bearing of the bell tower from the fountain is 140° more than the bearing of the statue from the fountain.

Write down, in terms of x , the bearing of the bell tower from the fountain.

..... $^\circ$ [1]

(b). The bearing of the bell tower from the fountain is also three times the bearing of the statue from the fountain.

Work out the bearing of the bell tower from the fountain.

..... $^\circ$ [4]

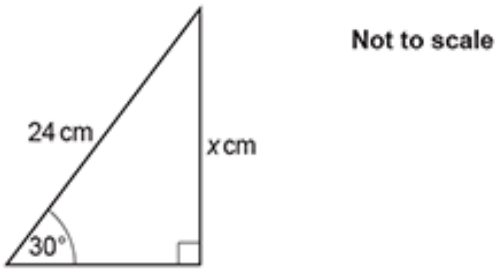
126(a).

Circle the value of $\sin 30^\circ$.

$\frac{1}{2}$ $\frac{\sqrt{3}}{2}$ $\frac{1}{3}$ $\frac{\sqrt{3}}{3}$ $\frac{1}{4}$

[1]

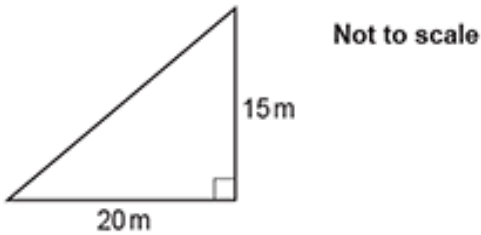
(b). Here is a right-angled triangle.



Work out the value of x .

$x =$ [2]

127. The diagram shows Kai’s garden.
It is in the shape of a right-angled triangle.



Kai is going to spread grass seed on the garden.

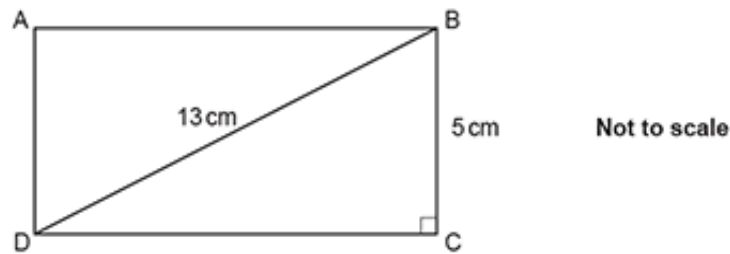
- A bag of grass seed covers an area of 35 m^2 .
- Each bag of grass seed costs £8.99.

Kai can only buy whole bags of grass seed.
Kai buys the least number of bags needed for the garden.

Calculate the cost of buying the bags of grass seed that Kai needs.
You must show your working.

£ [6]

128. The diagram shows rectangle ABCD.

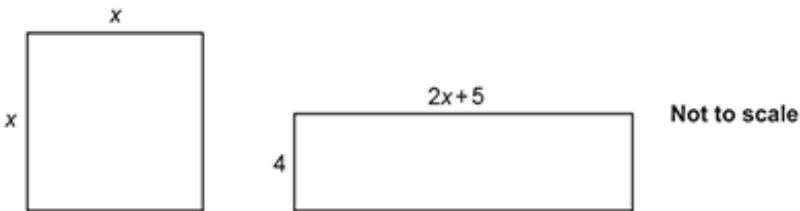


$DB = 13\text{ cm}$ and $BC = 5\text{ cm}$.

Calculate the area of the rectangle.
You must show your working.

..... cm^2 [5]

129(a). In this question, all measurements are in centimetres.



The square and the rectangle have the same area.

Show that $x^2 - 8x - 20 = 0$.

[3]

(b). Solve $x^2 - 8x - 20 = 0$.

(c). Explain why one of the answers in part above is not possible in the context of the question.

[1]

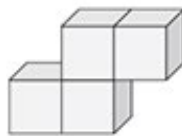
i. The area of the square.

(i) cm² [1]

ii. The length of the rectangle.

(ii) cm [1]

They put 4 of these cubes together to make this shape.



Calculate the surface area of the shape.

..... cm² [4]

131. Ellis has 28 m of ribbon.
They cut the ribbon into lengths of 60 cm.

What is the least length of ribbon, in cm, that can be left over?
You must show your working.

..... cm **[5]**

132. Frankie and Taylor travel the same distance from town A to town B.

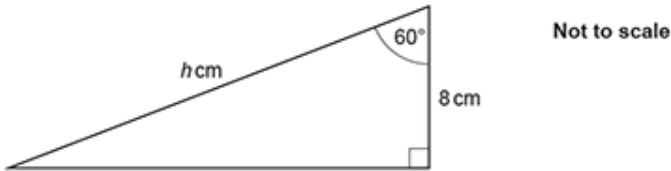
Frankie travels at an average speed of 52 kilometres per hour (km/h).
Taylor travels at an average speed of 15 metres per second (m/s).

The journey takes Frankie 4 hours.

Calculate how long the journey takes Taylor.
Give your answer in hours and minutes, correct to the **nearest minute**.
You must show your working.

..... hours minutes **[6]**

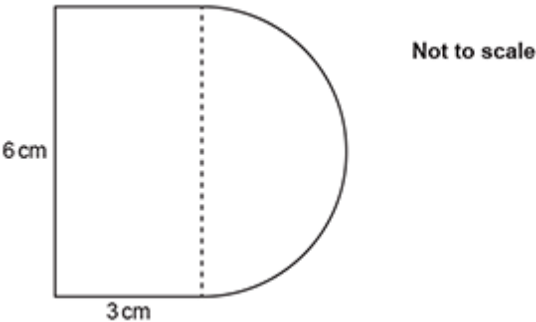
133. Here is a right-angled triangle.



Work out the value of h .

$h = \dots\dots\dots$ [3]

134. A rectangle, 6 cm by 3 cm, and a semi-circle are joined to make this shape.



Work out the area of the shape.

$\dots\dots\dots\text{cm}^2$ [4]

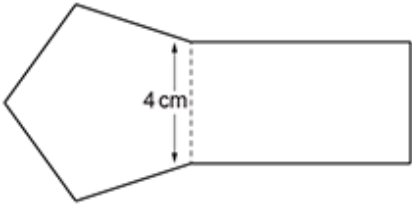
135. Force is measured in newtons (N).
A force of 198.5 N is applied to a rectangular surface of length 4.9 cm and width 4.1 cm.

Work out an estimate of the pressure, in N / cm², applied to this rectangular surface.

[The formula for pressure is: $\text{Pressure} = \frac{\text{Force}}{\text{Area}}$]

..... N / cm² [4]

136. The shape below is formed by a rectangle of width 4 cm and a regular pentagon.
For the rectangle, the ratio of the width to the length is 2 : 5.



Not to scale

Work out the perimeter of the shape.

..... cm [4]

137. A car mechanic has a tin containing 5 litres of engine oil.
Each week they use 450 millilitres of this oil for their vehicles.

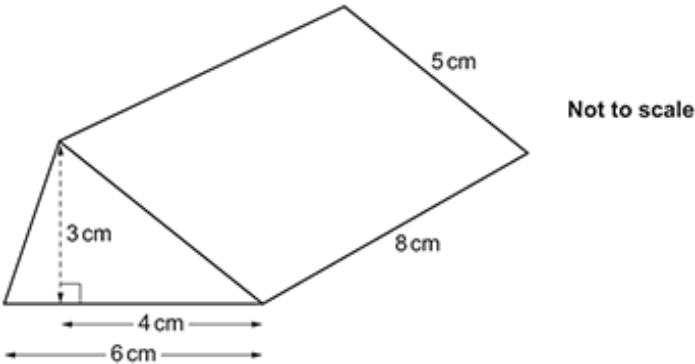
The car mechanic says

After 9 weeks I will have used over 80% of the oil in this tin.

Are they correct?
Show how you decide.

[5]

138(a). The diagram shows a prism.



Show that the volume of the prism is 72 cm³.

[2]

(b). A cuboid with a square base also has a volume of 72 cm³.
The height of the cuboid is 2 cm.

Work out the length of one side of the square base.

..... cm [3]

END OF QUESTION PAPER